ASEPTIC MEASURES IN OPERATION THEATRE

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- OPERATION THEATRE COMPLEX
  - Scientifically planned
  - Barrier system
  - Located away from the inpatient area and on top floor

- **CONSISTS of 4 zones**
  - A. OUTERZONE - Areas for receiving patients messengers,toilets,administrative function
  - B RESTRICTED ZONE OR CLEAN ZONE -
    - Changing room - Patient transfer area
    - Stores room - Nursing staff room
    - Anaesthetist room - Recovery room

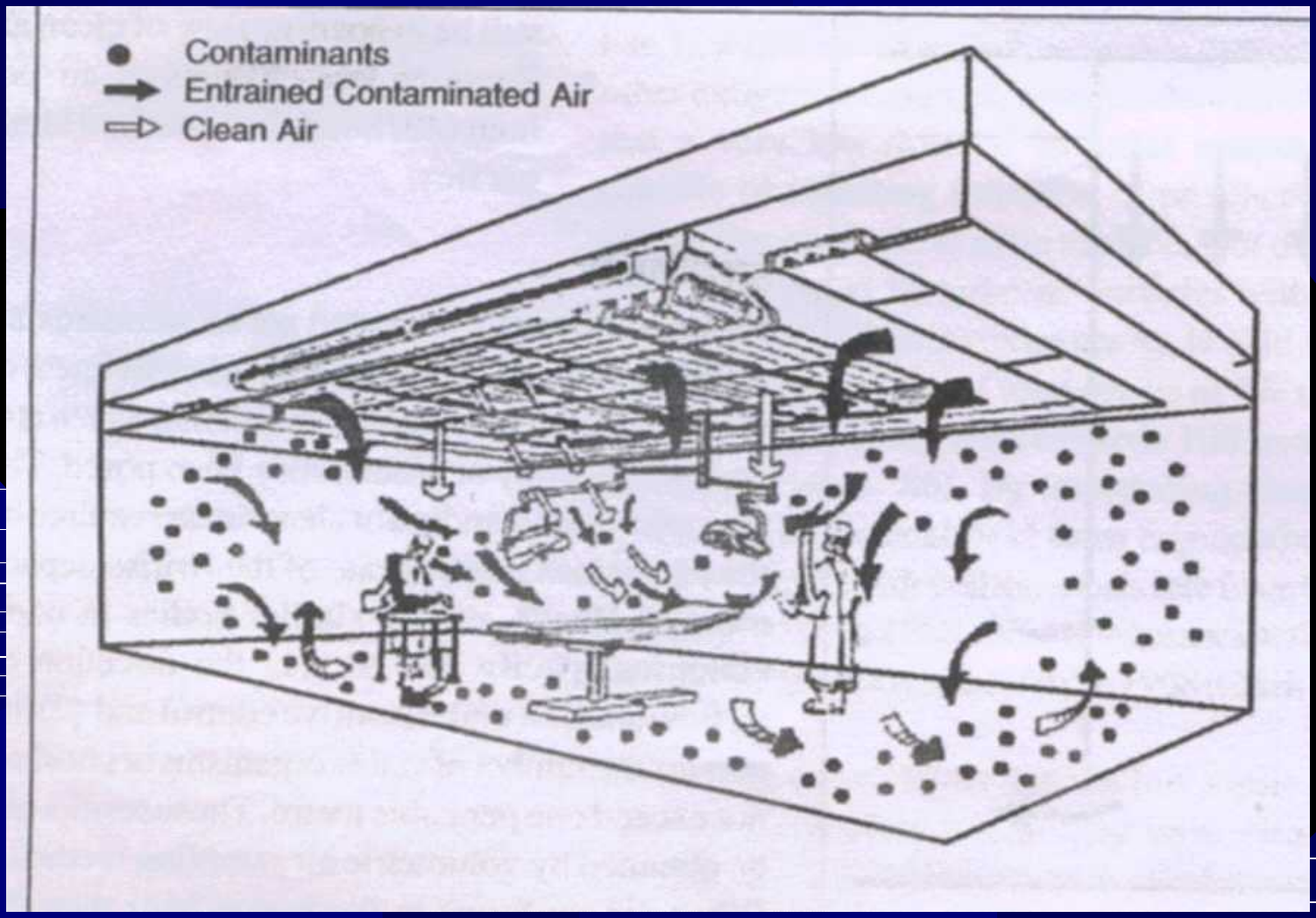
- C. ASEPTIC ZONE –
  - Scrub area
  - Preparation room,
  - Operation theatre,
  - Area for instrument packing and sterilization.
- D. DISPOSAL ZONE
  - Area where used equipment are cleaned and biohazardous waste is disposed

OPERATION ROOM

- Big enough for free circulation
- Two openings
  - Towards scrub area
  - Towards sterile area
- Openings fitted with swing doors.
- Marble or polished stone flooring
- Glaze tiled walls
- No false ceiling

- Well ventilated
- Air circulation by positive pressure through High efficiency particulate air filter (HEPA) system (0.3ú)
- As per US Public Health services minimum requirement for OR air are 25 changes per hour , positive pressure compared with corridors temperature between 18& 24º C humidity of 50 to 55%
- Operation table to be kept away from the entrance and head end should be close to the sterile area

O.T WITH HEPA FILTER



CLEANING AND DISINFECTION

- Cleaning, disinfection and sterilization are the cornerstones in ensuring Operation Room asepsis

Cleaning

- **Is a form of decontamination**
- **Removes organic matter and visible soils, that interfere with the action of disinfectant**
- **Reduces the bacterial count.**
- **Scrubbing with detergents and rinsing with water**

DISINFECTION

- Phenol (Carbolic acid 2%)
- Used for
  - Washing floor every day after surgery
  - Mopping of OR walls,OR tables,matts, instrument trolleys, stools
  - Followed by a wipe done with 70% alcohol.

FORMALDEHYDE FUMIGATION

- Commonly used to sterilize the OR.
- *For an area* of 1000 cubic feet
- ***REQUIREMENT***
  - 500 ml of 40% formaldehyde in one litre of water
  - Stove or hot plate for heating formalin
  - 300 ml of 10% Ammonia

PROCEDURE

- Close all doors & windows air tight and switch off fans and A.C.
- Heat formalin solution till boiling dry
- Leave the OT unentered over night
- Enter the OT next day morning with 300ml of ammonia
- Keep the ammonia solution for 2-3 hrs to neutralize formalin vapours
- Open the OT to start surgery

Advised fumigation at weekly intervals

COMMERCIALLY AVAILABLE DISINFECTANT

Bacillocid special

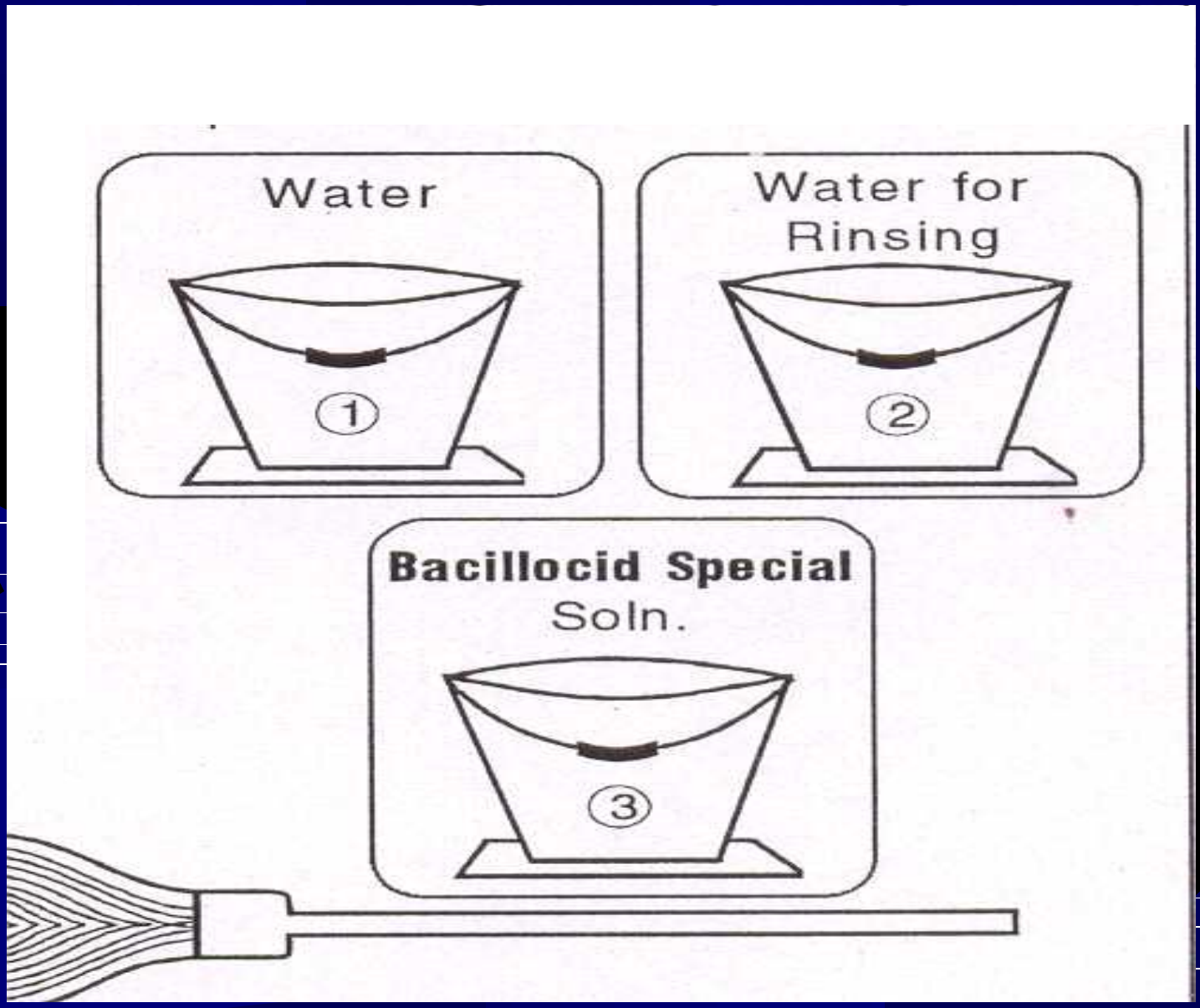
- Is a surface and environmental disinfectant
- Has a very good cleansing property along with bactericidal, virucidal , sporicidal and fungicidal activity
- *Composition*
  - Each 100 g contains:
    - 1.6 Dihydroxy 11.2G
    - (Chemically bound formaldehyde)
    - Glutaraldehyde 5.0g
    - Benzalkonium chloride 5.0g
    - Alkyl urea derivatieves 3.0g

- Sprayed or mopped liberally allowing 30 min contact time

MOPPING OF FLOORS

- 3 bucket system
  - **1st Bucket with water** :
    - dirty mop is rinsed
  - **2nd Bucket with fresh water for rinsing** ;
    - Mop rinsed again in this water
  - **3rd Bucket with low level disinfectant** :
    - Mop is immersed in the solution and the floor mopped liberally .
    - Wash the used mop with disinfectant after use and dry thoroughly before reuse.

3 BUCKET SYSTEM



Bacillocid

- Advantages
  - Provides complete asepsis within 30 to 60 mts.
  - Cleaning with detergent or carbolic acid not required
  - Formalin fumigation not required
  - Shutdown of O.T. for 24 hrs not required

ULTRA VIOLET RADIATION

- Daily U.V. Irradiation for 12 -16 hrs
- To be switched off 2 hrs before surgery

STERILIZATION OF INSTRUMENTS

- Instruments need thorough cleaning after every operation and before the next sterilization
- Cleaning can be done either manually or mechanically

ULTRA SONIC CLEANER

USED FOR

- Cleaning of micro surgical instruments and instruments with hinged areas and serrated edges

PRINCIPLE

- Sound waves pass at a frequency of 100,000hz or more in the liquid.These waves generate submicroscopic bubbles, which then collapse creating a negative pressure on the particles in the suspension.

ULTRA SONIC CLEANER.

- Bacteria disintegrate and protein matter is coagulated by this action.
- *Not recommended* for telescopes, endoscopes or other lumened devices such as phaco or irrigation & aspiration hand pieces.

ULTRA SONIC CLEANER.

ARRANGEMENT OF INSTRUMENTS AND PACKING

- Arrange the instruments in trays
- Place heavy instruments at the bottom of the tray
- Place a signolac indicator inside the tray
- Double wrap the instruments set with linen
- Apply a signolac indicator with a dated label out side the pack also.

STERILIZATION

- Sterilization is a complete destruction of all microorganisms, (both the vegetative forms and their spores.)

Sterilizing agents available

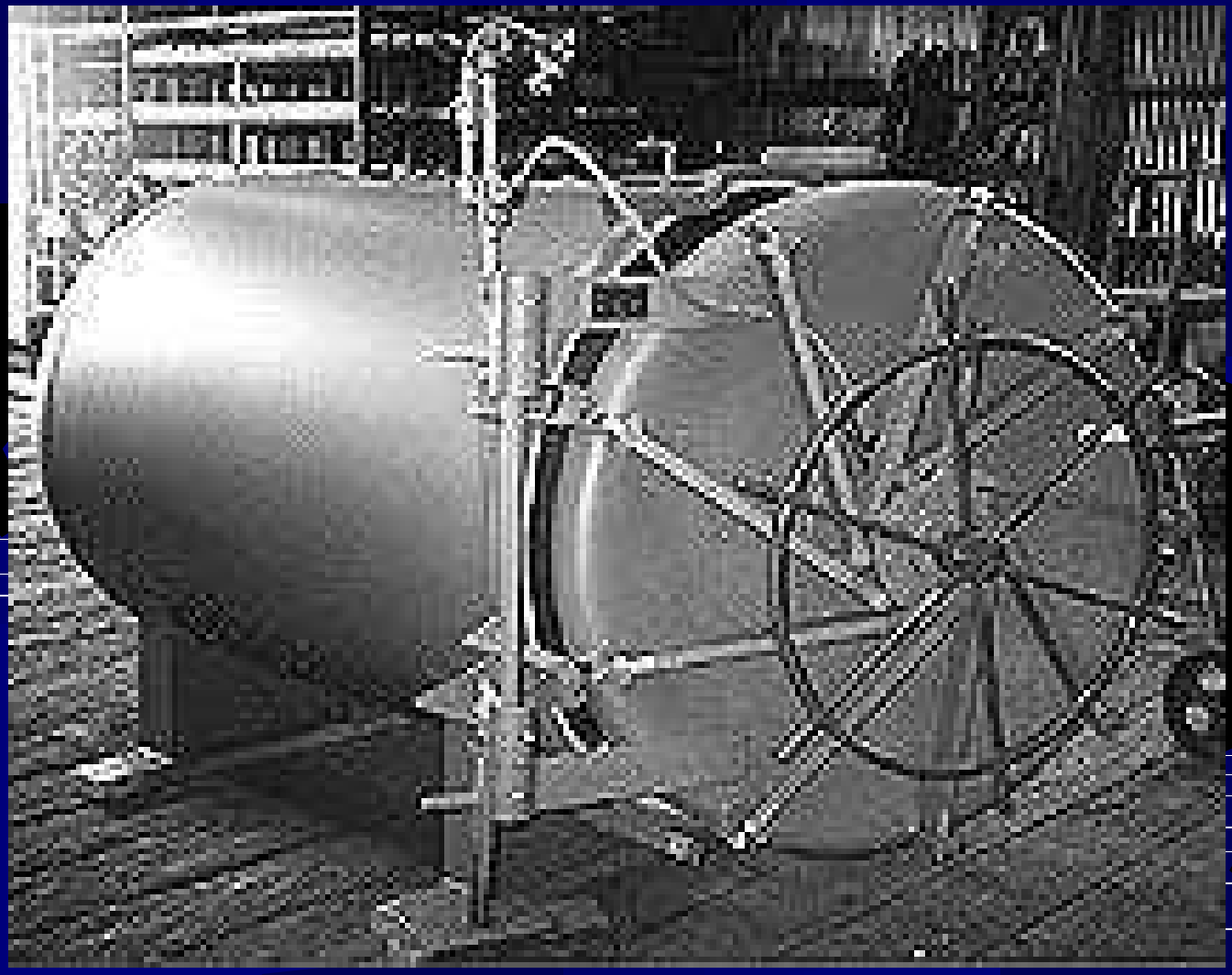
- Steam under pressure [AUTOCLAVE]
- Ethylene oxide [E.T.O.]
- High-level disinfectant
- Irradiation

AUTOCLAVE

- **Steam sterilization:** Autoclaving is suitable for sterilization of most metallic ophthalmic instruments, except sharp knives and fine scissors.
  - Autoclaving at 121°C for 20 minutes at 15 lbs psi pressure effectively kills most microorganisms & spores
- Types of autoclaves
  - Gravity displacement type
  - Pre vacuum type.
  - Vertical or horizontal type

AUTOCLAVE (VERTICAL)

AUTOCLAVE (HORIZONTAL)



WORKING OF AN AUTOCLAVE

- Various stages in the process of autoclaving

1. Loading
2. Closing
3. Air removal
4. Steam exposure
5. Holding
6. Exhaust
7. Drying
8. Unloading

- Autoclaving at 121 degree C/ 15 lbs for 20 min effectively kills micro organisms and their spores.

FLASH STERILISATION

- Emergency sterilization
  - 132º C at 30 lbs of pressure for 3mnts

ETHYLENE OXIDE (E.T.O.)

- Kills micro organisms by altering their DNA by alkylation.
- Widely used for resterilising ‘ packaged heat sensitive devices’ like sharp knives and blades.
- Effective and safe for heat labile tubings, vitrectomy cutters, cryoprobes, light pipes, laser probes, diathermy leads.

ETHYLENE OXIDE (ETO)

E.T.O.

- A typical ETO sterilization cycle includes:

1. Packing of the articles to be sterilized.
2. Arranging and loading the sterilizer
3. Air removal with a vacuum pump
4. Heating to the required temperature, (45 C– 55 C)
5. Steam humidification maintained at a relative humidity of 60 %

E.T.O.

6. Exposure to the ETO at 5 psi for 12 hours or 10 psi for 6 hours
6. Gas removal by 70 psi vacuum.
7. Air flush by filtered air repeated 4 times to reestablish atmospheric pressure
6. Aeration to elute residual ETO .

GLUTARALDEHYDE (2%)

Suitable for

- Instruments that cannot be autoclaved .
- Sharp cutting instruments, plastic & rubber items , endoscopes.

Effective against

- Vegetative pathogens in 15 mts and resistant pathogenic spores in 3 hrs.

Caution

- should be thoroughly rinsed serially 2 to 3 times in trays filled with sterile water.

Not recommended

- For lumen containing instruments such as irrigating cannulae as the residual glutaraldehyde, even after rinsing, causes corneal oedema, endothelial cell damage and uveitis.

GAMMA IRRADIATION

- Cold sterilization
- High penetrating power
- Lethal to DNA
- No appreciable rise in temperature
- Most useful for disposable & rubber items as well as ringer lactate.

MICROBIOLOGICAL MONITORING

- **Swabbing and culture for bacteria in OR**
  - Frequency -Once a month

Areas swabbed – In all ORs

1. Operation table at the head end
2. Over head lamp
3. Four Walls.
4. Floor below the head end of the table
5. Instrument trolley
6. AC duct
7. Microscope handles

- Media for culture
  - Aerobic - Chocolate agar
  - Anaerobic - Robertson's Cooked Meat Medium

MICROBIOLOGICAL MONITORING

- Quality of air in OR
  - Settle plate method
  - Frequency (Once a month)
  - Procedure
    - One plate of blood agar and sabouraud dextrose agar (SDA) is placed in the center of the OR (Close to operation table) and the lid is kept open for 30 min.

Quality of air in ORs

- Blood agar incubated at 37° C for 48 hrs,& SDA incubated at 27° C for 7 days.
- Colony counts of bacteria and fungi are reported. Bacterial colony count of more than 10 per plate and fungal colony of more than one per plate are considered unacceptable.
- Microbiology department sends out the reports to OR and maintains records of the same.

TESTING EFFICACY OF AUTOCLAVES

- Biological and chemical indicators are used to monitor the effectiveness of sterilization.
- Biological indicators (BI) containing bacterial spores are used for monitoring the efficacy of sterilizers.

FOR AUTOCLAVES

- Commercially available spore strips (Hi- Media, Mumbai) impregnated with spores of Bacillus steriothermophillus.
- Spore strips are inserted in the cold compartment of the autoclave which is the lowest part of the chamber.
- After autoclaving of the load the strips are aseptically transferred in trypticase soy broth, and are incubated at 56° C for 5 days

- The broth is examined intermittently for signs of turbidity
- Chemical indicator such as Bowie–Dick tapes(signolac) show a change of color after exposure to sterilizing temperature when applied to the packs and articles in the load
- The tape develops diagonal lines when exposed for the correct time to the sterilizing temperature

Bowie–Dick tapes(signolac)

Before sterilization

After sterilization

FOR ETO STERILISER

- Biological indicator is a Bacillus subtlis spore.

HAND WASHING PROCEDURE

- Remove watch and other jewellery
- Use **aquaguard water** for hand washing
- Turn on the tap using the elbow
- Wet hands from tips to elbows holding up to enable water to run down from finger to elbow
- Apply soap and scrub each hand with the other

- Use rotatory movements from fingertips to elbows with special attention to the nails and the webs of fingers
- Rinse thoroughly under running water in the same manner as above
- Scrub with soap and water for 7-8 minutes

- Use rotatory movements from fingertips to elbows with special attention to the nails and the webs of fingers
- Rinse thoroughly under running water in the same manner as above
- Scrub with soap and water for 7-8 minutes

FRONT

BACK

Not missed

Less frequently missed

Most frequently missed

- With povidone – iodine or chlorhexidine solution, scrubbing twice for 1 - 2 minutes each is adequate
- Close tap with elbow taking care not to touch any spot that has been scrubbed
- Dry with a sterile towel, begin with hands and proceed to wrist and forearm
- Iodophor or an alcohol are applied following the surgical scrub.
- Approximately 3-5 ml of alcohol for 5mts. is rubbed until the hands are dry. Using at least 9-25ml of alcohol

- The proper method of wearing gown and gloves to be followed

  - Use of sterile gloves with out any perforations.
  - After wearing sterile gloves
  - Wash hands with Balanced Salt solution (BSS) or Ringer's lactate to remove talc from the gloves.

STERILE DRAPES TO ISOLATE EYELASHES/LID MARGINS

- Use of sterile drapes to cover the face, ocular adnexa and isolate eyelashes and lid margins to reduce the passage of micro organisms into the eye

IRRIGATING FLUIDS AND VISCOELASTICS

- The fluids for intraocular and intravenous use such as BSS, Ringer's lactate, etc. should be inspected for intact packing and for any obvious bacterial or fungal contamination.
- Any visible particulate matter should render a bottle unsafe for use even if its sterile packing seems undisturbed.

THANK YOU